

**PY-201**

**B. Pharm. (Second Semester)**

**EXAMINATION, June, 2011**

**(Grading/Non Grading)**

**ADVANCED MATHEMATICS**

**(PY-201)**

*Time : Three Hours*

*Maximum Marks : 70*

**Note :** Attempt any *five* questions. All questions carry equal marks.

1. (a) Form the differential equation of simple harmonic motion given by : 7

$$x = A \cos (\omega t + \phi)$$

where A and  $\phi$  are constants.

- (b) Solve : 7

$$\frac{dy}{dx} = (x + y)^2$$

2. (a) Solve : 7

$$\frac{d^2y}{dx^2} - 5 \frac{dy}{dx} + 6y = e^{3x}$$

- (b) Solve the simultaneous equations : 7

$$\frac{dx}{dt} = 7x - y, \frac{dy}{dt} = 2x + 5y$$

3. (a) Find Laplace transform of : 7

$$f(t) = 2 + \sqrt{t} + \frac{1}{\sqrt{t}}, t > 0$$

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(b) Find :

$$L\{e^{-t} \sin^2 t\}$$

4. (a) Find :

$$L^{-1}\left\{\frac{s-5}{s^2+6s+13}\right\}$$

(b) Solve the initial value problem :

$$\frac{dy}{dt} + 3y = 0, y(0) = 1$$

5. (a) Determine the Mean, Median and Mode for the following data :

Mid Value	Frequency	Cum. f
15	2	2
20	22	24
25	19	43
30	14	57
35	3	60
40	4	64
45	6	70
50	1	71
55	1	72

(b) Calculate the mean and standard deviation of the following data :

Age Group	Frequency
5-15	15
15-25	15
25-35	23
35-45	22
45-55	25
55-65	10
65-75	5
75-85	10

6. (a) What is the probability that :

- (i) A non-leap year will have 53 Sundays
- (ii) A leap year will have 53 Sundays

(b) The probability that a pen manufactured by a company will be defective is  $\frac{1}{10}$ . If 12 such pens are manufactured, find the probability that :

- (i) Exactly two pens will be defective.
- (ii) At least two pens will be defective.
- (iii) None will be defective.

7. (a) Find the mean and variance of the Poisson's distribution.

(b) The mean height of 500 students is 151 cm and the standard deviation is 15 cm. Assuming that the heights are normally distributed, find the number of students whose heights lie between 120 and 155 cm.

(Provide normal distribution table)

8. (a) Fit a straight line to the following data :

x	y
2	2
5	4
6	6
9	9
11	10

(b) Calculate the Karl Pearson's coefficient of correlation from the data given below :

x	y
4	2
6	3
8	4
10	6
12	10